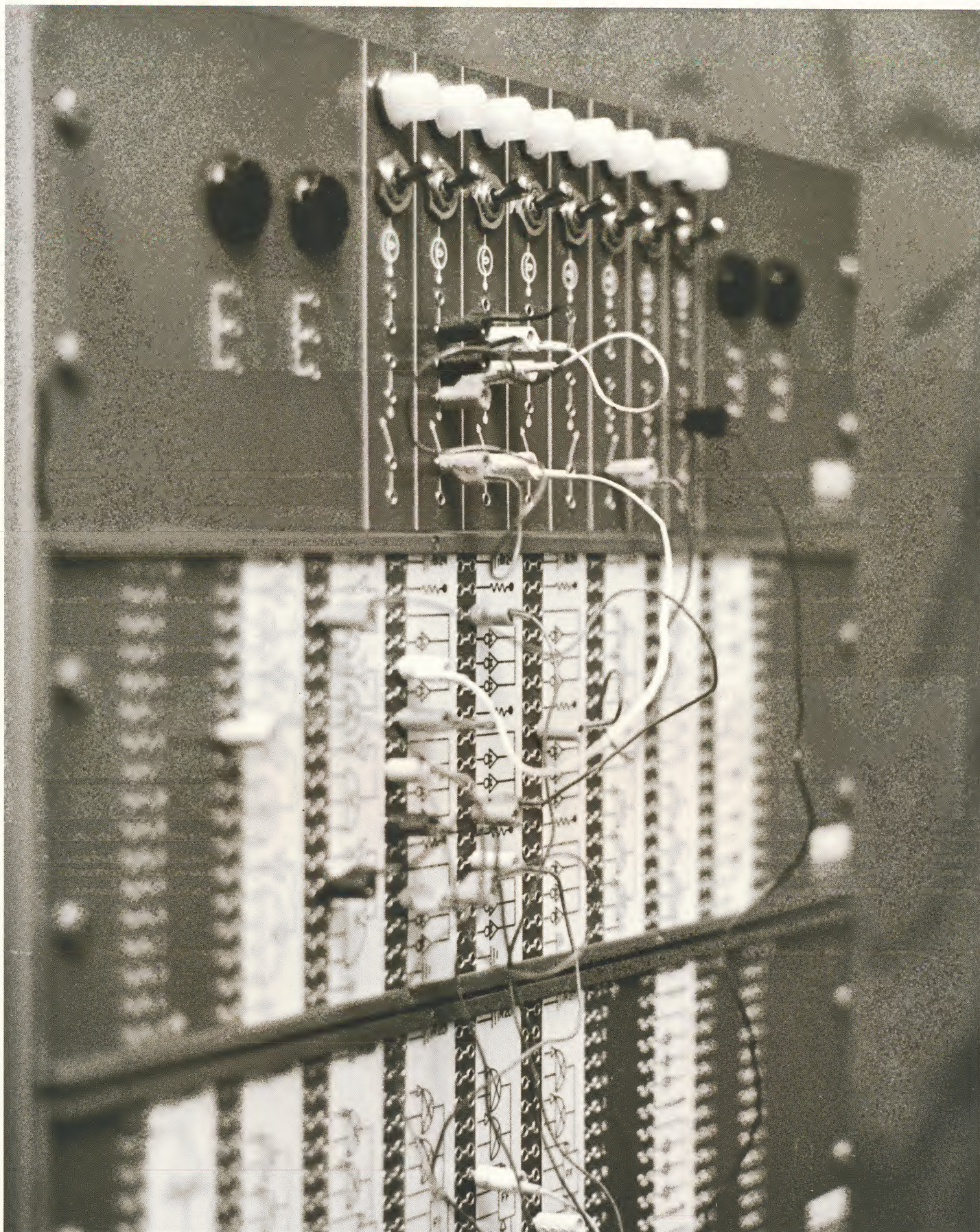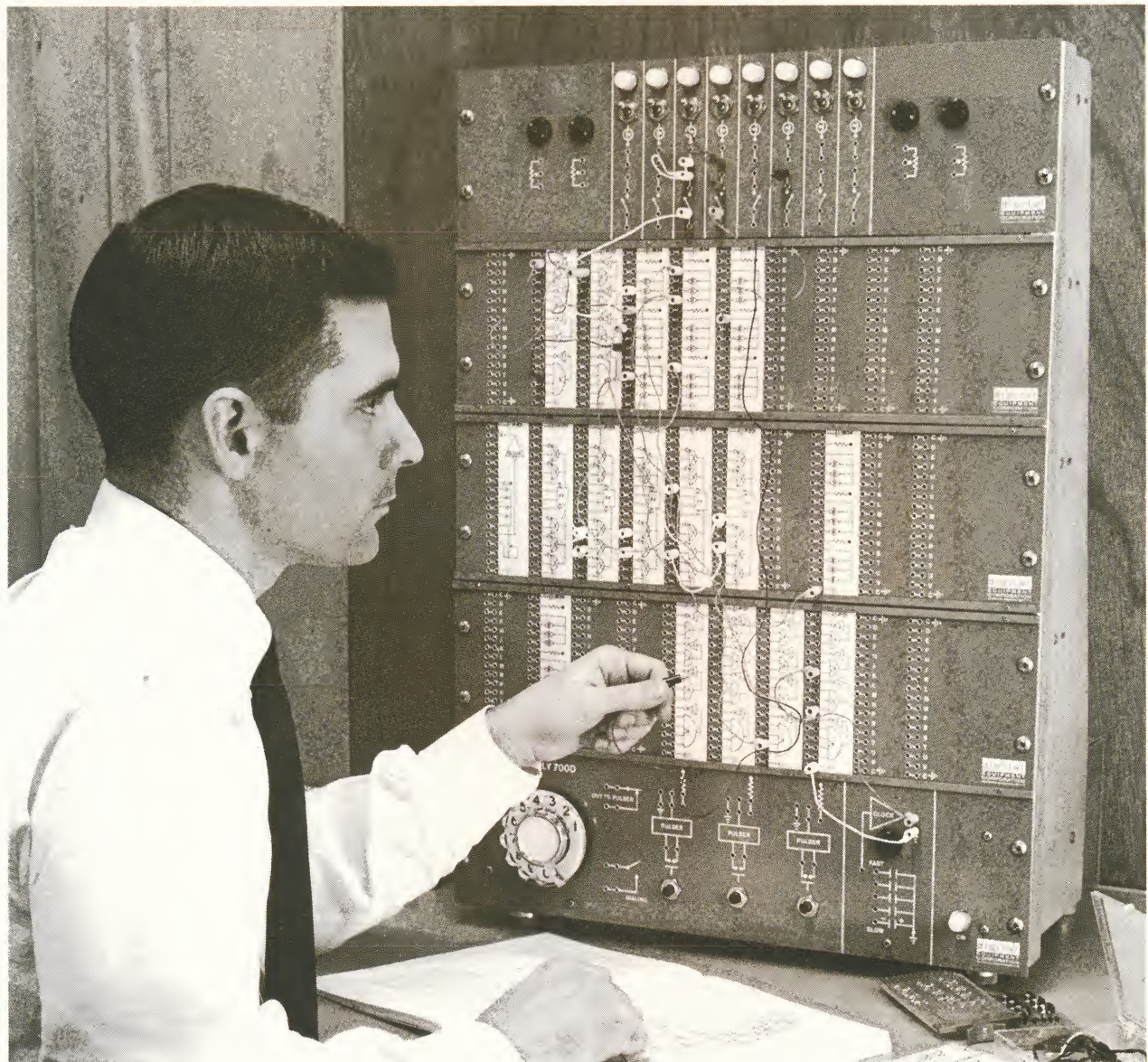# DIGITAL LOGIC LABORATORY

DIGITAL EQUIPMENT CORPORATION • MAYNARD, MASSACHUSETTS

The Logic Laboratory is a new training device and design tool — engineered specifically for these uses and supported by comprehensive instructional literature.

From simple, complete instructions the newcomer to digital logic can learn quickly to construct operating logical systems — *and* understand them. His Logic Laboratory has all of the elements necessary — power supply, pulse generators, controls, indicators, mounting hardware, and Digital's famous logic modules. And he can pursue his expanding design knowledge virtually without limit, because the hardware itself is entirely flexible and expandable. Ultimately, the Logic Laboratory, without modification, becomes the experienced designer's breadboarding system, with which full scale computer elements or test systems can be constructed.

EDUCATION AND TRAINING

The key to the Logic Laboratory's excellence as a teaching device is flexibility. Because only three basic module types are needed to learn basic logic, the student builds up his own understanding of compound logic functions. NAND and NOR gates are combined to perform all of the basic gating functions, such as AND, OR, NOT, and half-add. In the process, the student masters the elements of logic in a way that mere patching by rote cannot do.

Flexibility is a feature of the Logic Laboratory Workbook, too. Experiments can be short and simple, or the quicker student can explore numerous possibilities suggested by additional problems contained in the Workbook.

Still another aspect of flexibility is that the Logic Laboratory teaches universal principles, not a narrow system tied to the company's products. The extremely simple loading rules for FLIP CHIP™ modules eliminate a large investment in initial learning time. Logic diagrams contain simplified symbols field-tested by leading training directors. And the system of logic itself follows standard material appearing in several leading textbooks.

BREADBOARDING AND TESTING

The digital designer or technician will find that the Logic Laboratory meets all professional requirements for exacting laboratory use. Prime reason is the FLIP CHIP line of digital modules, of the highest quality and available in a wide variety. These guaranteed logic circuits have high noise rejection, excellent driving power, and short-proof circuits. Frequency range is 0 to 2 megacycles. Silicon semiconductors in most circuits guarantee wide temperature tolerance. Testing of every module is thorough; for example, flip-flop modules receive 25 to 50 separate tests.

WORKBOOK AND CATALOG

The Workbook was prepared specifically for the Logic Laboratory. It contains ten graded experiments, or laboratory sessions, each of over 3-hours duration. No prior knowledge of electronics or digital logic is required, although the experiments should be performed in conjunction with a course in logic design or textbook study (several texts are recommended). All basic logic elements and techniques are covered, and all can be carried out with the basic Laboratory described below.

Unlike the Workbook, which teaches fundamentals of logic, the FLIP CHIP Catalog shows how to select and use FLIP CHIP modules. The Catalog is both a user's handbook and a detailed specification of the product line. It contains clear statements of loading rules, applications with diagrams, a 27-page appendix providing relevant background and reference material, and specifications for over 100 modules and accessories.

SPECIFICATIONS

The Logic Laboratory can grow from a minimum student's setup to a computer sized system with standard equipment available from Digital. The Workbook specifies the equipment needed for each project described, and the Catalog contains much additional information on FLIP CHIP modules for advanced students and system designers.

The basic Logic Laboratory described below is entirely adequate for learning the fundamental principles of digital logic introduced in the Workbook.

POWER SUPPLY AND PULSE SOURCE PANEL	Power supply will drive about 100 FLIP CHIP modules. Four pulse sources are provided: three Schmitt triggers and one variable speed clock. Three pushbuttons and a telephone dial control inputs to the Schmitt pulsers.
CONTROL PANEL	Eight indicator lights for data read-out, eight switches for manual inputs, and four potentiometers for controlling clock rates and delays.
LOGIC MOUNTING PANEL	Contains pluggable connections for ten FLIP CHIP modules. The suggested basic assortment is six flip-flops (each with clear and set inputs, and five gated inputs), 12 NOR gates (in three modules) and 4 NAND gates (in one module).
MOUNTING RACK	Mounts up to five panels.
OVERALL DIMENSIONS	Width: 19 in. Height 27 in. Depth: 11½ in.
WEIGHT	21 pounds.
POWER CONSUMPTION	750 watts maximum.
PRICE	$885.40.

EXPANDED LOGIC LABORATORIES

An applications engineer from the Digital sales office nearest you will be glad to demonstrate basic and expanded Logic Laboratories. He can show you a four-panel system that permits experiments with longer word lengths, or a five panel system for analog-to-digital and digital-to-analog conversion. Use the attached reply card.
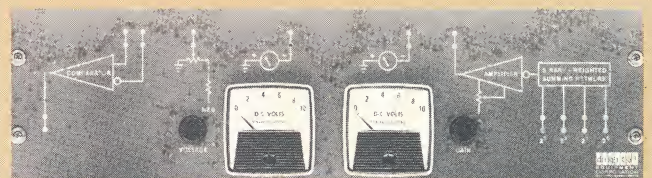
Digital-to-Analog Converter and Comparator

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DIGITAL LOGIC LABORATORY WORKBOOK

FLIP CHIP MODULES

Use the attached reply card to request a demonstration of the Logic Laboratory and receive a free copy of the Workbook. Free copies of the FLIP CHIP Catalog also available.

DIGITAL SALES AND SERVICE

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146 Main Street, Maynard, Massachusetts 01754
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